

Application No.: 10/604,275
Amendment dated: December 21, 2005
Reply to Office Action of July 21, 2005
Attorney Docket No.: 21295.56

This listing of claims will replace all prior versions and listings of claims in this application:

a.) Listing of Claims

1. (Currently Amended) A method for scanning a wafer specimens using an optical imaging system and a scanning stage, comprising the steps of:

- positioning the wafer with a constant thickness on the scanning stage, the wafer having three-dimensional features within a focusing depth of the imaging system;
- calibrating the scanning stage by obtaining and storing height values Z at different calibration positions X, Y of the scanning stage, and thereby generating a height profile of the scanning stage;
- scanning the wafer specimens, and thereby
 - determining a reference height Z_{ref} of the wafer specimen at the beginning of a specimen scan,
 - traveling to wafer specimen points X_p , Y_p using the scanning stage,
 - setting, while traveling to a respective wafer specimen point X_p , Y_p , a wafer specimen height position Z_p pertinent to the respective wafer specimen point X_p , Y_p , the wafer specimen height position Z_p being determined from the reference height Z_{ref} and the height profile of the scanning stage, and
 - acquiring an image and/or performing a measurement at the respective wafer specimen point X_p , Y_p .

2.(Currently Amended) The method as defined in Claim 1, wherein images of the wafer specimen are acquired by means of a camera, and/or measurements on the wafer specimen being made by means of an optical measurement device, at the wafer specimen points X_p , Y_p .

3.(Currently Amended) The method as defined in Claim 1, wherein the reference height Z_{ref} of the wafer specimen is identified at the beginning of the wafer

Application No.: 10/604,275
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specimen scan by focusing with a focusing system at a reference location X_{ref} , Y_{ref} of the wafer specimen.

4.(Original) The method as defined in Claim 1, wherein upon calibration of the scanning stage, the height values Z are obtained by focusing with a focusing system.

5.(Currently Amended) The method as defined in Claim claim 1, wherein during the wafer specimen scan, the image is acquired and/or the measurement is made without stopping the scanning stage at the respective wafer specimen point X_p , Y_p .

6.(Currently Amended) The method as defined in Claim 1 one of the foregoing claims, wherein with wafer specimen points X_p , Y_p arranged line-by-line, the wafer specimen points X_p , Y_p are scanned in meander fashion.

7.(Original) The method as defined in claim Claim 1, wherein the height values Z identified at the calibration positions X, Y are stored in a lookup table.

8.(Currently Amended) The method as defined in Claim claim 1, wherein the wafer specimen height positions Z_p at the wafer specimen points X_p , Y_p are determined, by interpolation or mathematical approximation functions, from the height profile of the scanning stage.

9.(Currently Amended) The method as defined in Claim 7, wherein if the calibration positions X, Y and the wafer specimen points X_p , Y_p are coincident, the wafer specimen height position Z_p is determined from the corresponding height value Z from the lookup table, and the reference height Z_{ref} .

10.(Currently amended) The method as defined in Claim claim 1, wherein for calibration of the scanning stage, a flat substrate is placed onto the scanning stage.

Application No.: 10/604,275
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11. (Currently Amended) The method as defined in Claim claim 1, wherein the optical imaging system is a microscope.
12. (Currently Amended) The method as defined in Claim claim 1, wherein the optical imaging system is a macroscope.
13. (Currently Amended) The method as defined in Claim claim 3, wherein the focusing system is an LED or laser autofocus system.
14. (Currently Amended) The method as defined in Claim claim 2, wherein an image field of the camera and the spacings of the wafer specimen points X_p, Y_p are selected in such that an image of the entire wafer specimen results when the images of all the wafer specimen points X_p, Y_p are juxtaposed.
15. (Currently Amended) An apparatus for scanning a wafer specimen using an optical imaging system and a scanning stage, comprising comprises:
 - a control unit for displacing the scanning stage, to at least one calibration position X, Y during a calibration of the scanning stage in order to obtain a height profile of the scanning stage; and for displacing to specimen at least one wafer specimen point X_p, Y_p during scanning of the wafer of a constant thickness, the wafer having three-dimensional features within a focusing depth of the imaging system specimen; and for setting a wafer specimen height position Z_p at each wafer specimen point X_p, Y_p ;
 - a memory for storing the height profile of the scanning stage;
 - a computation unit for determining the wafer specimen height position Z_p at the respective wafer specimen points X_p, Y_p from a reference height Z_{ref} of the wafer specimen and from the height profile of the scanning stage; and
 - an optical device for acquiring data at each wafer specimen point X_p, Y_p .
16. (Currently Amended) The apparatus as defined in Claim 15, wherein the optical device is a camera for acquiring images at each wafer specimen point X_p, Y_p .

Application No.: 10/604,275
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17. (Currently Amended) The apparatus as defined in Claim 15, wherein the optical device is an optical measurement device for performing a measurement at respective wafer specimen points X_p, Y_p.
18. (Original) The apparatus as defined in Claim 15, wherein a focusing system is provided at least for focusing onto at least one reference location X_{ref}, Y_{ref} in order to obtain a reference height value Z_{ref}.
19. (Currently Amended) The apparatus as defined in ~~one of~~ Claim 15, wherein the optical imaging system is a microscope.
20. (Currently Amended) The apparatus as defined in ~~one of~~ Claim 15, wherein the optical imaging system is a macroscope.
21. (Original) The apparatus as defined in Claim 17, wherein the measurement device is an optical spectrometer, an ellipsometer, or a layer thickness measurement system.